



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live.

Joseph E. Kernan
Governor

Lori F. Kaplan
Commissioner

February 11, 2004

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.in.gov/idem

TO: Interested Parties / Applicant

RE: Arch Wood Protection, Inc. / 127-18313-00066

FROM: Paul Dubenetzky
Chief, Permits Branch
Office of Air Quality

Notice of Decision: Approval - Registration

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 4-21.5-3-4(d) this order is effective when it is served. When served by U.S. mail, the order is effective three (3) calendar days from the mailing of this notice pursuant to IC 4-21.5-3-2(e).

If you wish to challenge this decision, IC 4-21.5-3-7 requires that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Room 1049, Indianapolis, IN 46204, **within eighteen (18) calendar days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

- (1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
- (2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
- (3) The date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

- (1) the name and address of the person making the request;
- (2) the interest of the person making the request;
- (3) identification of any persons represented by the person making the request;
- (4) the reasons, with particularity, for the request;
- (5) the issues, with particularity, proposed for considerations at any hearing; and
- (6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosures
FN-REGIS.dot 9/16/03

February 11, 2004

Mr. Ken Cogan
Arch Wood Protection, Inc.
1579 Koppers Road
Conley, Georgia 30288

Dear Mr. Cogan:

Re: Registration Operation Status,
127-18313-00066

The application from Arch Wood Protection, Inc., received on October 31, 2003, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-5.5, it has been determined that the following plant that produces wood preservatives at a maximum potential rate of 275,730,000 pounds per year, which involves mixing and compounding of chemicals located at 2852 Raystone Drive, Valparaiso, Indiana 46383, is classified as registered:

- (a) Three (3) Pack A Storage Tanks, identified as Tank 202, Tank 203 and Tank 204. Tank 202 has a capacity of 11,749 gallons; Tank 203 has a capacity of 13,535 gallons and Tank 204 has a capacity of 15,227 gallons.
- (b) One (1) Pack A or Pack B Storage Tank, identified as Tank 201 with a capacity of 8,565 gallons.
- (c) Two (2) MEA Storage Tanks, identified as Tanks 101 and Tank 102 each with a capacity of 15,227 gallons.
- (d) Two (2) Pack A Reactors, identified as RA1 and RA2 with a capacity of 5,000 gallons each.
- (e) One (1) Reactor, identified as RA3, with a capacity of 6,500 gallons.

The acid mist emission from the reactors is voluntarily controlled by venturi scrubber.

- (f) One (1) natural gas fired boiler with a heat input capacity of 10MMBTU/hr.

The following conditions shall be applicable:

(1) Opacity Limitations [326 IAC 5-1-2]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix

A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor in a six (6) hour period.

(2) Particulate Emissions from Process Operations [326 IAC 6-3]

Pursuant to 326 IAC 6-3 (Process Operations), the PM (acid mist overspray) emissions from the two (2) Reactors, RA1, and RA2 shall each be limited to 16.3 pounds per hour at 15,738 pounds per hour process weight. The PM limit shall be determined using the following equation:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished using below equation:

$$E = 4.10 P^{0.67} \quad \text{where } E = \text{rate of emission in pounds per hour and} \\ P = \text{process weight rate in tons per hour}$$

The venturi scrubber shall be operated according to the manufacturer's specifications at all times that the reactors RA-1 or RA-2 are in operation.

(3) New Source Performance Standards (NSPS) [326 IAC 12 and 40 CFR § 60, Subpart Kb] and [326 IAC 8-9]

- (a) Pursuant to Part 60.116, section (b) of this NSPS, the owner or operator of the two (2) MEA storage Tanks #1 and #2 with a capacity of 15,227 gallons each; and three (3) Pack A Storage Tanks with capacities of 13,535 gallons, 11,749 gallons, and 15,227 gallons shall keep readily accessible records showing the dimension of these storage tanks and an analysis showing the capacity of each storage tank.
- (b) Pursuant to Part 60.116b section (a) of this NSPS, the owner or operator of the two (2) MEA storage Tanks #1 and #2 with a capacity of 15,227 gallons each; and three (3) Pack A Storage Tanks with capacities of 13,535 gallons, 11,749 gallons and 15,227 gallons shall keep copies of the records required in section (a) of this condition for the life of the tanks.

(4) Volatile Organic Liquid Storage Vessels [326 IAC 8-9]

Pursuant to 326 IAC 8-9, the owner or operator of one (1) Pack A or Pack B Storage Tank identified as Tank 201, with a capacity of 8,565 gallons, shall maintain a record and submit to the department a report containing the following information of the vessel:

- (a) The vessel identification number.
- (b) The vessel dimensions.
- (c) The vessel capacity.

(5) New Source Performance Standards (NSPS)[326 IAC 12 and 40 CFR 60, Subpart Dc]

- (a) Pursuant to Part 60.48c(g), the owner or operator of the boiler shall record and maintain records of the amount of each fuel combusted during each day.
- (b) Pursuant to Part 60.48c(i), all records shall be maintained by the owner or operator for a period of two years following the date of such record.

(6) Particulate Matter (PM) [326 IAC 6-2-4]

Pursuant to 326 IAC 6-2-4, the particulate matter emissions from the boiler shall be limited to 0.6 pounds per million BTU heat input.

An authorized individual shall provide an annual notice to the Office of Air Quality that the source is in operation and in compliance with this registration pursuant to 326 IAC 2-5.5-4(a)(3). The annual notice shall be submitted to:

**Compliance Data Section
Office of Air Quality
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015**

no later than March 1 of each year, with the annual notice being submitted in the format attached.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,
Original signed by Paul Dubenetzky

Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

drp/mm

cc: File - Porter County
Porter County Health Department
Air Compliance - Rick Massoels
Northwest Regional Office
Permit Tracking
Technical Support and Modeling - Michele Boner
Compliance Data Section - Karen Ampil

Registration

This form should be used to comply with the notification requirements under 326 IAC 2-5.5-4(a)(3).

Company Name:	ArchWood Protection, Inc.
Address:	2852 Raystone Drive
City:	Valparaiso
Authorized individual:	Ken Cogan
Phone #:	(404) 363-6300 extension (6003)
Registration #:	127-18313-00066

I hereby certify that ArchWood Protection, Inc. is still in operation and is in compliance with the requirements of Registration 127-18313-00066.

Name (typed):
Title:
Signature:
Date:

Indiana Department of Environmental Management Office of Air Quality

Technical Support Document (TSD) for a Re-Registration

Source Background and Description

Source Name: Arch Wood Protection, Inc.
Source Location: 2852 Raystone Drive, Valparaiso, Indiana 46383
County: Porter
SIC Code: 2879
Registration No.: 127-18313-00066
Permit Reviewer: Madhurima D. Moulik

The Office of Air Quality (OAQ) has reviewed an application from Arch Wood Protection, Inc. relating to the operation of the following emission units used in the production of wood preservatives at a maximum potential rate of 275,730,000 pounds per year, which involves mixing and compounding of chemicals:

- (a) Three (3) Pack A Storage Tanks, identified as Tank 202, Tank 203 and Tank 204. Tank 202 has a capacity of 11,749 gallons; Tank 203 has a capacity of 13,535 gallons and Tank 204 has a capacity of 15,227 gallons.
- (b) One (1) Pack B Storage Tank, identified as Tank 201 with a capacity of 8,565 gallons.
- (c) Two (2) MEA Storage Tanks, identified as Tanks 101 and Tank 102 each with a capacity of 15,227 gallons.
- (d) Two (2) Pack A Reactors, identified as RA1 and RA2 with a capacity of 5,000 gallons each.

The acid mist emission from the reactors is voluntarily controlled by a venturi scrubber.

Adjustments due to this Revision

There are three changes made to the registration:

- 1) Item (e) would be added to the equipment list. This item would be: One (1) Reactor, identified as RA3, with a capacity of 6,500 gallons. Its emissions would also be controlled by the same venturi scrubber controlling RA1 and RA2.
- 2) Item (f) would be added to the equipment list. This item would be: One (1) natural gas fired boiler with a capacity of 10 mmBtu/hr.
- 3) Item (b) would be adjusted to read as follows: One (1) Pack A or Pack B Storage Tank, identified as Tank 201, with a capacity of 8,565 gallons.

Existing Approvals

The source has been operating under Registration No.: 127-16633-00066 issued on August 27, 2003.

Recommendation

The staff recommends to the Commissioner that the operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on October 31, 2003.

Emission Calculations

- (a) Wood Preservative Production: See Pages 1 through 13, TSD Appendix A of this document for detailed emissions calculations. Boiler calculations: Pages 14 and 15.
- (b) Emissions from new reactor, identified as RA-3, is based on the emissions from the two (2) existing reactors (RA-1 and RA-2), adjusted for the size of the reactor, and assuming that the same chemical is being used.

Wolman E Production - Process CA-B

Capacity of RA-3 = 6500 gallons

Capacity of existing tank = 5000 gallons

Total (CA-B manufacturing, 2 existing tanks) VOC emissions = 3.57E-05 lb/gal

Therefore, VOC emissions from each reactor = 1.79 x E-05gal

Potential throughput of new reactor = 27,545,455 gallons x (6500/5000) = 35,809,091 gal/year

Potential to Emit of VOC of reactor RA-3 = 1.79 x E-05 lb/gal x 35,809,091 gal/yr x 1 ton/2000 lb = **0.32 tons/yr**

Emissions of PM/PM-10: based on existing reactor calculations, adjusted for size of reactor.

Worst case uncontrolled PM/PM-10 (total for existing 2 reactors) =2.549 tpy

Worst case controlled PM/PM-10 (with a venturi scrubber at 80% efficiency) = 0.51 tpy

Therefore, for new reactor, PM/PM-10 uncontrolled = (2.549/2)x 6500/5000 tpy = **1.66 tpy**

PM/PM-10 (controlled) = **0.33 tpy**

Potential To Emit of the Source Including the Additions

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	6.56
PM-10	6.76
SO ₂	0.0

VOC	2.45
CO	3.7
NO _x	4.4

HAP's	Potential To Emit (tons/year)
Hexane	0.08
Lead	0.0014
TOTAL	0.08

Justification of Approval Level

- (a) The existing source's potential to emit (as defined in 326 IAC 2-7-1(29)) of particulate matter or particulate matter less than ten microns are greater than 5 tons per year but less than 25 tons per year. Therefore, the source is subject to 326 IAC 2-5.5, and will be issued a registration.

Actual Emissions

No previous emission data has been received from the source.

County Attainment Status

The source is located in Porter County.

Pollutant	Status
PM-10	unclassifiable
SO ₂	unclassifiable
NO ₂	attainment
Ozone	severe non-attainment
CO	attainment
Lead	not determined

- (a) Volatile organic compounds (VOC) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Porter County has been designated as severe non-attainment for ozone. Therefore, VOC emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3. See State Rule Applicability for the Source section.
- (b) Porter County has been classified as attainment or unclassifiable for all the other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2. See the State Rule Applicability for the Source section.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

- (1) each criteria pollutant is less than 100 tons per year,
- (2) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
- (3) any combination of HAPs is less than 25 tons/year.

Federal Rule Applicability

- (a) New Source Performance Standards (NSPS) (326 IAC 12 and 40 CFR Part 60) Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Storage Vessels) for which construction, reconstruction, or modification commenced after July 23, 1984.

According to 326 IAC 60.110b, this rule is applicable to tanks with capacities greater than 75 cubic meters (19789 gallons). However, pursuant to state rule 326 IAC 12, the old applicability threshold of 40 cubic meters (10554 gallons) apply. Therefore, this rule is applicable to the two (2) MEA storage Tanks #1 and #2 with a capacity of 15227 gallons each; and the three (3) Pack A Storage Tanks with capacities of 13535 gallons, 11749 gallons and 15227 gallons respectively. Pursuant to 40 CFR 60.116(a) and (b), the owners or operators of these tanks are required to keep readily accessible records showing the dimension of the storage tanks and an analysis showing the capacity of the storage tanks.

Part 60.116b section (a) of this NSPS requires the owner or operator of the two (2) MEA storage Tanks #1 and #2 with a capacity of 15227 gallons each; and three (3) Pack A Storage Tanks with capacities of 13535 gallons, 11749 gallons and 15227 gallons to keep copies of the records required in section (b) for the life of the tanks.

- (b) The boiler is subject to the New Source Performance Standards (NSPS) Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, because it was constructed after the applicability date of June 9, 1989, and its capacity is equal to the applicability threshold of 10 mmBtu/hr.
- (c) There are no National Emission Standards for Hazardous Air Pollutants (NESHAP)(326 IAC 14, 20 and 40 CFR Part 61, 63) applicable to this source.

State Rule Applicability - Entire Source

326 IAC 2-6 (Emission Reporting)

This source is located in Porter County and the potential to emit VOC is less than ten (10) tons per year. Therefore, 326 IAC 2-6 does not apply.

326 IAC 2-3 (Emission Offset)

The potential to emit of VOC from this source is less than 25 tons per year. Therefore, 326 IAC 2-3 is not applicable.

326 IAC 2-2 (Prevention of Significant Deterioration)

The potential to emit of all attainment criteria pollutants from this source are less than 250 tons per year, and it is not one of the twenty-eight (28) listed source categories. Therefore, 326 IAC 2-2 does not apply.

326 IAC 5-1 (Visible Emissions Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

- (1) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (2) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A,

Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

State Rule Applicability - Individual Facilities

326 IAC 8-1-6 (General Reduction Requirements)

The emission units at this source have potential VOC emissions below 25 tons per year. Therefore, 326 IAC 8-1-6 does not apply.

326 IAC 8-9 (Volatile Organic Liquid Storage Vessels)

On and after October 1, 1995, this rule applies to storage vessels used to store volatile organic liquid (VOL) that are located in Clark, Floyd, Lake or Porter County with capacities less than or greater than 39,000 gallons.

- (1) The one (1) Pack A or Pack B Storage Tank, identified as Tank 201, with a capacity of 8,565 gallons, is subject to the following reporting and recordkeeping requirements of section (6)(a) and (6)(b) and exempt from all the other requirements of this rule:
 - (A) The owner or operator of each vessel to which section 1 of this rule applies shall maintain a record and submit to the department a report containing the following information for each vessel:
 - (i) The vessel identification number.
 - (ii) The vessel dimensions.
 - (iii) The vessel capacity.
- (2) The two (2) MEA storage Tanks #1 and #2 with a capacity of 15,227 gallons each; and three (3) Pack A Storage Tanks with capacities of 13,535 gallons, 11,749 gallons and 15,227 gallons are exempted from 326 IAC 8-9, as they are subject to 40 CFR 60, Subpart Kb, New Source Performance Standards for VOL Storage Tanks.

There are no other 326 IAC 8 rules that applies to this existing source.

326 IAC 6-3-2 (Process Operations) and 40 CFR 52, Subpart P

The potential PM emissions from reactor RA-3 is less than 0.551 pounds per hour. Therefore, RA-3 is exempt from the requirements of this rule.

Pursuant to Registration No.: 127-16633-00066, the PM (acid mist overspray) emissions from the two (2) reactors, RA1 and RA-2 shall be limited by the following equation:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$$E = 4.10 P^{0.67} \quad \text{where } E = \text{rate of emission in pounds per hour and} \\ P = \text{process weight rate in tons per hour}$$

$$\begin{aligned} \text{Process wt. for each reactor RA1 and RA-2} &= 275,730,000 \text{ lbs/yr} * \text{yr}/8760 \text{ hrs} / 2 \\ &= 15738 \text{ lbs/hr} * \text{ton}/2000 \text{ lbs} \\ &= 7.86 \text{ tons/hr} \end{aligned}$$

$$\begin{aligned} E &= 4.10 (7.86 \text{ tons/hr})^{0.67} \\ &= \mathbf{16.3 \text{ lbs/hr}} \text{ for each reactor.} \end{aligned}$$

The venturi scrubber shall be operated according to the manufacturer's specifications at all times that the reactors RA-1 and RA-2 are in operation.

Each reactor is in compliance with 326 IAC 6-3, since the PM emission is less than what is allowed in the rule.

326 IAC 6-2-4 (Particulate Matter Limitations for Sources of Indirect Heating)

The 10 mmBtu/hr boiler, to be constructed in 2003, is subject to 326 IAC 6-2-4.

Pursuant to this rule, particulate emissions from indirect heating facilities constructed after September 21, 1983, shall be limited by the following equation:

$$Pt = 1.09/(10)^{0.26}$$

where:

Pt = Pounds of particulate matter emitted per million Btu heat input.

Q = Total source maximum operating capacity rating in million Btu per hour = 10 mmBtu/hr.

$$\text{Therefore } Pt = 1.09/1.82 = 0.6 \text{ lb/mmBtu} = 6.0 \text{ lb/hr}$$

The potential PM emissions from the boiler are less than 6.0 lb/hr.
Therefore, the boiler meets this rule.

Conclusion

The operation of this wood preservative production plant shall be subject to the conditions of the attached Registration No.: 127-18313-00066.

**Emissions Calculations
Summary**

Page 1 of 15 TSD Appendix A

Source Name: Arch Wood Protection, Inc.

Source Address: 2852 Raystone Drive, Valparaiso, Indiana 46383

Registration No.: 127-18313-00066

Permit Reviewer: Madhurima D. Moulik

Date: 10-Dec-03

Source	Description	VOC	PM/PM10	Copper	Iron	Nickel *	Lead *	Zinc
		Max (tons/yr)	Max (ton/yr)	Max (ton/yr)	Max (ton/yr)	Max (ton/yr)	Max (ton/yr)	Max (ton/yr)
Process (CA-B)		0.810						
Process (CBA-A)		0.430						
Worst Process Case Uncontrolled Emissions		0.810	4.210	2.500	0.004	1.400E-03	1.400E-03	0.009
Worst Process Case Controlled Emissions		0.810	0.840	0.500	0.001	0.000	0.000	0.002
	MEA Tank #1	1.800E-03						
	MEA Tank #2	1.800E-03						
	Pack A Tank #1	1.800E-03						
	Pack A Tank #2	9.400E-04						
	Pack A Tank #3	9.400E-04						
	Pack B Tank	9.400E-04						
	Fugitives	1.628	2.549	2.500E+00	4.000E-03	1.400E-03	1.400E-03	9.000E-03
10 mmBtu/hr Boiler		0.200	0.300					
Facility Total Uncontrolled (tons/year)		2.446	6.759	5.000	0.008	0.003	0.003	0.018
Facility Total Controlled (tons/year)		2.446	0.840					
Worst Single HAP Uncontrolled (tons/year)			0.001					
Total Combined HAPs Uncontrolled(tons/year)			0.003					
Total Worst Single HAPControlled (tons/year)			0.000					
Total Combined HAPs Controlled(tons/year)			0.000					

Notes:

Potential hours of operation is 8760.

Actual hours of operation is 4160 (16 hours/day, 5 days/week, 52 weeks/year).

Fugitive emissions from unloading/loading activities were assumed to be equal to process mixing emissions.

Tank emissions were calculated using EPA's Tanks 4.0 program.

HAPs (Metals) is controlled by a scrubber w/ 80% removal efficiency.

* - only HAPs included under the 187 regulated HAPs

Potential Production	
50,500 lbs/batch	
15 batches/day	
24 hours/day	
7 days/week	
52 weeks/year	
Potential Production =	275,730,000 lbs/year
Density =	10.01 lbs/gallon
Potential Production =	27,545,455 gallons/year

Actual Production	
50,500 lbs/batch	
10 batches/day	
16 hours/day	
5 days/week	
52 weeks/year	
Actual Production =	131,300,000 lbs/year
Density =	10.01 lbs/gallon
Actual Production =	13,116,883 gallons/year

Potential VOC Emissions from CA-B Manufacturing

Component	VOC Emission Factor (lbs/gallon)	Potential Production Throughput (gallons)	Potential VOC Emissions (lbs/year)	Potential VOC Emissions (tons/year)
Boric Acid	0.00E+00	27,545,455	0.00	0.00
Carbon Dioxide	0.00E+00	27,545,455	0.00	0.00
Copper Carbonate	0.00E+00	27,545,455	0.00	0.00
Tebuconazole	0.00E+00	27,545,455	0.00	0.00
Water	0.00E+00	27,545,455	0.00	0.00
Diethanolamine	0.00E+00	27,545,455	0.00	0.00
Monoethanolamine	3.50E-05	27,545,455	963.42	0.48
Polyoxyethylene Cocoamine	7.12E-07	27,545,455	19.61	0.01
Total Potential VOC Emissions =			983.03	0.49

CA-B Batch Emission Factor Summary

Component	Mix Tank Loading Emission Factor (lbs/gallon)	Tank Agitation Emission Factor (lbs/gallon)	Combined Emission Factor (lbs/gallon)
Boric Acid	0.00E+00	0.00E+00	0.00E+00
Carbon Dioxide	0.00E+00	0.00E+00	0.00E+00
Copper Carbonate	0.00E+00	0.00E+00	0.00E+00
Tebuconazole	0.00E+00	0.00E+00	0.00E+00
Water	0.00E+00	0.00E+00	0.00E+00
Diethanolamine	0.00E+00	0.00E+00	0.00E+00
Monoethanolamine	1.60E-05	1.90E-05	3.50E-05
Polyoxyethylene Cocoamine	4.19E-07	2.93E-07	7.12E-07
Total VOC	1.64E-05	1.93E-05	3.57E-05

This spreadsheet is used to calculate the factors used in the emission estimating spreadsheets.

Products Manufactured 1 Batch
Batch Size 50,500 lbs
Density 10.01 lbs/gal
Weight Percent Solvents 34.78%

CA-B Batch Characteristics at 68 degrees Fahrenheit

CA-B Formulation	Weight Fraction in Product	VOC %	lbs VOC per batch	Molecular Weight (lbs/lb mol)	Specific Gravity	Moles	Mole Fraction	Vapor Pressure @ 68F (mmHg)	Partial Pressure (mmHg)	Mole Fraction	Vapor Molecular Weight (lbs/lb mol)	Mass Fraction
Boric Acid	0.00%	0.00%	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	6.40%	0.00%	-	-	-	-	-	-	-	-	-	-
Copper Carbonate	16.70%	0.00%	-	-	-	-	-	-	-	-	-	-
Tebuconazole	0.40%	0.00%	-	-	-	-	-	-	-	-	-	-
Water	41.72%	0.00%	-	-	-	-	-	-	-	-	-	-
Diethanolamine	0.00%	100.00%	-	105.1	1.09	0.000	0.00%	0.0007	0.000	0.00%	0.000	0.00%
Monoethanolamine	31.45%	100.00%	15,882.25	61.1	1.02	260.007	97.89%	0.40	0.395	99.47%	60.760	97.45%
Polyoxyethylene Cocoamine	3.33%	100.00%	1,681.65	300.0	0.99	5.606	2.11%	0.10	0.002	0.53%	1.592	2.55%
	100.00%					265.612	100.00%		0.398	100.00%	62.352	100.00%

Wolman E Production - Process CA-B

Emissions from loading solvents into reactor using AP-42- Chapter 5.2-4

$$\text{Emissions (loading)} = 12.46 \cdot S \cdot P \cdot M \cdot Q / T$$

S = Saturation Factor 1.45
P = Vapor Pressure of the material loaded at temperature T 0.0077 psia
M = Vapor molecular weight 62.35 lb/lb-mol
Q = Volume of material loaded 5.045 1,000 gal/batch
T = Temperature = 68.0 °F
= 527.7 °R
Batch Size = 5,045 gallons

$$\begin{aligned} \text{Emissions (loading)} &= 12.46 \cdot S \cdot P \cdot M \cdot Q / T = 0.083 \text{ lbs/batch} \\ &= 1.64\text{E-}05 \text{ lbs/gallon} \end{aligned}$$

Solvent	Mass Fraction in Vapor	Emissions lbs/batch	Emissions lbs/gallon
Boric Acid	0.00%	0.00E+00	0.00E+00
Carbon Dioxide	0.00%	0.00E+00	0.00E+00
Copper Carbonate	0.00%	0.00E+00	0.00E+00
Tebuconazole	0.00%	0.00E+00	0.00E+00
Water	0.00%	0.00E+00	0.00E+00
Diethanolamine	0.00%	0.00E+00	0.00E+00
Monoethanolamine	97.45%	8.07E-02	1.60E-05
Polyoxyethylene Cocoamine	2.55%	2.12E-03	4.19E-07
Total Emissions =		0.083	1.64E-05

Wolman E Production - Process CA-B

Surface evaporation from reactor due to mixing.

$$Ex = B * \{Mx * Kx * A * Px * 3600 * H\} / \{R * T\}$$

Where:

Ex = Emissions of VOC species x (lb/hr)

Mx = Molecular weight of VOC species X (lb/lbmole)

Kx = Gas Phase mass transfer coefficient of VOC species x (ft/sec)

$$Kx = 0.00438 * U^{0.78} * (18/Mx)^{1/3}$$

A = Surface area of tank (ft²)

$$U = \text{Wind Speed} = 0.1 \text{ mile/hr}$$

Px = Vapor pressure of VOC x (psia)

Mx = Molecular Weight of VOC

3600 = 3600 seconds per hour

H = Batch time (hours)

R = Universal gas constant (10.73 psia ft³/lb mole R)

T = Temperature of the liquid (R)

B = number of batches per year

H =	2.40	hours	
B =	1	batch	
R =	10.73		
T =	68.0	°F	
T =	527.7	°R	
A =	277.59	ft ²	Used 9.4 ft diameter for mixing tank
Batch Size =	5,045	gallons	

Species	Mx lb/lbmol	Px psia	Kx	Emissions lbs/batch	Emissions lbs/gallon
Boric Acid	0.0	0.000	0.000000	0.000	0.00E+00
Carbon Dioxide	0.0	0.000	0.000000	0.000	0.00E+00
Copper Carbonate	0.0	0.000	0.000000	0.000	0.00E+00
Tebuconazole	0.0	0.000	0.000000	0.000	0.00E+00
Water	0.0	0.000	0.000000	0.000	0.00E+00
Diethanolamine	105.1	0.000	0.000404	0.000	0.00E+00
Monoethanolamine	61.1	0.008	0.000484	0.096	1.90E-05
Polyoxyethylene Cocoamine	300.0	0.000	0.000285	0.001	2.93E-07
Total Emissions =				0.097	1.93E-05

Potential VOC Emissions from CBA-A Manufacturing

Component	VOC Emission Factor (lbs/gallon)	Potential Production Throughput (gallons)	Potential VOC Emissions (lbs/year)	Potential VOC Emissions (tons/year)
Boric Acid	0.00E+00	27,545,455	0.00	0.00
Carbon Dioxide	0.00E+00	27,545,455	0.00	0.00
Copper Carbonate	0.00E+00	27,545,455	0.00	0.00
Tebuconazole	0.00E+00	27,545,455	0.00	0.00
Water	0.00E+00	27,545,455	0.00	0.00
Diethanolamine	1.26E-08	27,545,455	0.35	0.00
Monoethanolamine	3.07E-05	27,545,455	845.26	0.42
Polyoxyethylene Cocoamine	6.25E-07	27,545,455	17.20	0.01
Total Potential VOC Emissions =			862.82	0.43

**Wolman E Production - Process CBA-A
CBA-A Batch Emission Factor Summary**

Component	Mix Tank Loading Emission Factor (lbs/gallon)	Tank Agitation Emission Factor (lbs/gallon)	Combined Emission Factor (lbs/gallon)
Boric Acid	0.00E+00	0.00E+00	0.00E+00
Carbon Dioxide	0.00E+00	0.00E+00	0.00E+00
Copper Carbonate	0.00E+00	0.00E+00	0.00E+00
Tebuconazole	0.00E+00	0.00E+00	0.00E+00
Water	0.00E+00	0.00E+00	0.00E+00
Diethanolamine	6.33E-09	6.27E-09	1.26E-08
Monoethanolamine	1.40E-05	1.66E-05	3.07E-05
Polyoxyethylene Cocoamine	3.68E-07	2.57E-07	6.25E-07
Total VOC	1.44E-05	1.69E-05	3.13E-05

Wolman E Production - Process CBA-A

This spreadsheet is used to calculate the factors used in the emission estimating spreadsheets.

Products Manufactured 1 Batch
Batch Size 50,500 lbs
Density 10.01 lbs/gal
Weight Percent Solvents 42.51%

CBA-B Batch Characteristics at 68 degrees Fahrenheit

CBA-B Formulation	Weight Fraction in Product	VOC %	lbs VOC per batch	Molecular Weight (lbs/lb mol)	Specific Gravity	Moles	Mole Fraction	Vapor Pressure @ 68F (mmHg)	Partial Pressure (mmHg)	Mole Fraction	Vapor Molecular Weight (lbs/lb mol)	Mass Fraction
Boric Acid	9.25%	0.00%	-	-	-	-	-	-	-	-	-	-
Carbon Dioxide	6.40%	0.00%	-	-	-	-	-	-	-	-	-	-
Copper Carbonate	16.70%	0.00%	-	-	-	-	-	-	-	-	-	-
Tebuconazole	0.40%	0.00%	-	-	-	-	-	-	-	-	-	-
Water	24.74%	0.00%	-	-	-	-	-	-	-	-	-	-
Diethanolamine	7.73%	100.00%	3,903.65	105.1	1.09	37.129	12.26%	0.0007	0.000	0.03%	0.027	0.04%
Monoethanolamine	31.45%	100.00%	15,882.25	61.1	1.02	260.007	85.88%	0.40	0.347	99.44%	60.744	97.40%
Polyoxyethylene Cocoamine	3.33%	100.00%	1,681.65	300.0	0.99	5.606	1.85%	0.10	0.002	0.53%	1.592	2.55%
	100.00%					302.742	100.00%		0.349	100.00%	62.363	100.00%

Wolman E Production - Process CBA-A

Emissions from loading solvents into reactor

$$\text{Emissions (loading)} = 12.46 \cdot S \cdot P \cdot M \cdot Q / T$$

S = Saturation Factor 1.45
P = Vapor Pressure of the material loaded at temperature T 0.0067 psia
M = Vapor molecular weight 62.36 lb/lb-mol
Q = Volume of material loaded 5.045 1,000 gal/batch
T = Temperature = 68.0 °F
= 527.7 °R
Batch Size = 5,045 gallons

$$\begin{aligned} \text{Emissions (loading)} &= 12.46 \cdot S \cdot P \cdot M \cdot Q / T = 0.073 \text{ lbs/batch} \\ &= 1.44\text{E-}05 \text{ lbs/gallon} \end{aligned}$$

Solvent	Mass Fraction in Vapor	Emissions lbs/batch	Emissions lbs/gallon
Boric Acid	0.00%	0.00E+00	0.00E+00
Carbon Dioxide	0.00%	0.00E+00	0.00E+00
Copper Carbonate	0.00%	0.00E+00	0.00E+00
Tebuconazole	0.00%	0.00E+00	0.00E+00
Water	0.00%	0.00E+00	0.00E+00
Diethanolamine	0.04%	3.19E-05	6.33E-09
Monoethanolamine	97.40%	7.08E-02	1.40E-05
Polyoxyethylene Cocoamine	2.55%	1.86E-03	3.68E-07
Total Emissions =		0.073	1.44E-05

Wolman E Production - Process CBA-A

Surface evaporation from reactor due to mixing.

$$Ex = B * \{Mx * Kx * A * Px * 3600 * H\} / \{R * T\}$$

Where:

Ex = Emissions of VOC species x (lb/hr)

Mx = Molecular weight of VOC species X (lb/lbmole)

Kx = Gas Phase mass transfer coefficient of VOC species x (ft/sec)

$$Kx = 0.00438 * U^{0.78} * (18/Mx)^{1/3}$$

A = Surface area of tank (ft²)

U = Wind Speed = 0.1 mile/hr

Px = Vapor pressure of VOC x (psia)

Mx = Molecular Weight of VOC

3600 = 3600 seconds per hour

H = Batch time (hours)

R = Universal gas constant (10.73 psia ft³/lb mole R)

T = Temperature of the liquid (R)

B = number of batches per year

H = 2.40 hours
B = 1 batch
R = 10.73
T = 68.0 °F
T = 527.7 °R
A = 277.59 ft² Used 9.4 ft diameter for mixing tank
Batch Size = 5,045 gallons

Species	Mx lb/lbmol	Px psia	Kx	Emissions lbs/batch	Emissions lbs/gallon
Boric Acid	0.0	0.000	0.000000	0.000	0.00E+00
Carbon Dioxide	0.0	0.000	0.000000	0.000	0.00E+00
Copper Carbonate	0.0	0.000	0.000000	0.000	0.00E+00
Tebuconazole	0.0	0.000	0.000000	0.000	0.00E+00
Water	0.0	0.000	0.000000	0.000	0.00E+00
Diethanolamine	105.1	0.000	0.000404	0.000	6.27E-09
Monoethanolamine	61.1	0.007	0.000484	0.084	1.66E-05
Polyoxyethylene Cocoamine	300.0	0.000	0.000285	0.001	2.57E-07
Total Emissions =				0.085	1.69E-05

Potential Metals and Particulate Emissions

Batch Size 50,500 Pounds
Production rate 15 Batches/day
Potential Hours 24 hours/day
7 days/week

Raw Material	Weight Lbs/Batch	Composition	Composition %	Airborne Rate %	Scrubber Efficiency %	Controlled Emissions					
						Copper Emissions	Iron Emissions	Nickel Emissions	Lead Emissions	Zinc Emissions	Particulate Emissions
Copper Carbonate	8,434	Copper	55%	0.02%	80%	0.1855	0.0003	0.0001	0.0005	0.0007	0.1855
		Sulfate	0.05%	0.02%	80%						0.0000
		Iron	0.10%	0.02%	80%						0.0003
		Nickel	0.03%	0.02%	80%						0.0001
		Lead	0.03%	0.02%	80%						0.0005
		Zinc	0.20%	0.02%	80%						0.0007

Total Emissions	(lb/batch)	0.1855	0.0003	0.0001	0.0005	0.0007	0.1872
Total Emissions	(lb/year)	1013.0320	1.8419	0.5526	2.7620	3.6838	1021.8722
Total Emissions	(tons/year)	0.5065	0.0009	0.0003	0.0014	0.0018	0.5109
Total Emissions	(tons/hour)	0.000058	0.000000	0.000000	0.000000	0.000000	0.000058

Raw Material	Weight Lbs/Batch	Composition	Composition %	Airborne Rate %	Uncontrolled Emissions					
					Copper Emissions	Iron Emissions	Nickel Emissions	Lead Emissions	Zinc Emissions	Particulate Emissions
Copper Carbonate	8,434	Copper	55%	0.02%	0.9277	0.0017	0.0005	0.0005	0.0034	0.9277
		Sulfate	0.05%	0.02%						0.0000
		Iron	0.10%	0.02%						0.0017
		Nickel	0.03%	0.02%						0.0005
		Lead	0.03%	0.02%						0.0005
		Zinc	0.20%	0.02%						0.0034

Total Emissions	(lb/batch)	0.9277	0.0017	0.0005	0.0005	0.0034	0.9338
Total Emissions	(lb/year)	5065.1601	9.2094	2.7628	2.7620	18.4188	5098.3130
Total Emissions	(tons/year)	2.5326	0.0046	0.0014	0.0014	0.0092	2.5492
Total Emissions	(tons/hour)	0.000290	0.000001	0.000000	0.000000	0.000001	0.000292

Composition data provided by AWP, July 2002.

Airborne rate taken from data supplied by AWP, based on stack sampling data October 1998.